satisfactory when the dimensions do not vary too much and are fairly constant. Identification by a given description becomes difficult when either one or both dimensions vary between wide limits. The distinguishing dimensional features of the æciospores of a given species, for instance, are not determined by the lowest and highest values (*e. g.*, 15–26 by 22–41μ) that the spores may attain, but by the most common combinations of width and length measured; that is, by the standard values. The latter can not be expressed in averages, which will vary with the numerical basis used and with the personal factor in picking out the spores to be measured. The numerical basis in particular is a factor which has been almost totally neglected in descriptions. I propose to give, in all cases but those of very constant measurements, a formula containing the numerical basis, the extreme range of width and length and the most common combinations of width and length found. The formula in our example would read: (48) 15–26μ by 22–41μ (19–22 by 26–30μ). (48) is self-explanatory; it gives the numerical basis; that is, the number of spores measured. 15–26μ by 22–41μ are the extreme measurements of width and length. (19–22 by 26–30μ) are the standard values of width and length. These values are found by arranging all measurements in two progressive tables, one by widths, the other by lengths. It is then an easy matter to find the most common values.

In cases where misunderstandings may arise the formula can be given as follows: (48 measured) 15–26μ by 22–41μ (standard 19–22 by 26–30μ).

For all measurements of a simple nature the old formula can still be retained, although the numerical basis should in every case be given. The method is, of course, not confined in its usefulness and accuracy to spores alone.

E. P. MEINECKE

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE North Carolina Academy of Science held its fourteenth annual meeting at Wake Forest College on Friday and Saturday, April 30 and May 1, 1915. The reading of papers began at 2:50 P.M. on Friday and continued until 5:30, at which time adjournment was had, followed by the annual meeting of the executive committee. At night Dean Charles E. Brewer, of Wake Forest College, made the academy welcome to the college. President J. J. Wolfe, of the academy, then delivered his presidential address, "The Status of the Theory of Descent." Next Professor John F. Lanneau delivered a lecture "The Cosmoid," illustrated by an apparatus of his own design; and Professor A. H. Patterson gave a short talk on "The Importance of Humidity in Health and the Arts" with a demonstration of an interesting form of humidifier of North Carolina manufacture.

The academy met in annual business meeting on Saturday morning. Reports of the secretary-treasurer and of the various committees were made and an invitation for the academy to hold its next annual meeting at the State Agricultural and Mechanical College was accepted. An interesting discussion on the matter of membership was held and it was resolved to try to bring into the academy in 1916 all the scientific people of the state. To this end a large and representative canvassing committee was appointed. Ten new members were elected, who bring up the total membership to date to 70.

The following officers were elected for 1915–16.

President—A. S. Wheeler, University of North Carolina, Chapel Hill.

Vice-president—W. A. Withers, State Agricultural and Mechanical College, West Raleigh.

Secretary-treasurer—E. W. Gudger, State Normal College, Greensboro.

Additional members executive committee—Z. P. Metcalf, State Agricultural and Mechanical College, West Raleigh; W. C. Coker, University of North Carolina, Chapel Hill; E. T. Miller, Trinity College, Durham.

At the close of the business meeting, the reading of papers was resumed and continued until 1:30 when the program was finished. The total attendance was 21 out of a membership of 70. There were 23 papers on the program, of which only three were read by title. Perhaps the most marked feature of the meeting was the considerable discussion which followed the reading of many of the papers. Including the presidential address, which will be published in the current number of the *Journal* of the Elisha Mitchell Scientific Society, the following papers were presented:

An Outline of Modern Work bearing on the Theory of Descent: J. J. Wolfe.

Previous to 1900 the evolutionary hypothesis stood practically as Darwin left it in 1859. During the intervening years a tremendous mass of facts accumulated which tend to support it, but on the other hand some weighty objections have also been offered. These were, however, apparently met by the mutation theory which appeared in 1901, but unfortunately it has latterly encountered even graver difficulties than Darwinism itself. Its critics, Jeffrey in particular, have brought forward very strong evidence tending to identify the phenomena of mutation with hybridization. If this criticism shall stand, mutation is robbed of any just claim to being an explanation of evolution.

On the other hand, the work of Johanssen and others appears to demonstrate that individual variations are not heritable and all that selection can achieve is to resolve a species into its component elements, the so-called "pure lines," and choose that pure line manifesting the character in question developed to its highest degree. It can not carry the development of this character one whit beyond the limit attained by the species as a whole.

Now, if mutation is but the reappearance of some recessive character, segregating out from a long and complex process of hybridization in accordance with Mendelian principles, as De Vries's critics seem to have rendered highly probable; and if variation in the Darwinian sense be non-heritable, as the pure line investigations appear to show, how has the transition from one species to another occurred? That this has repeatedly taken place would seem to be beyond intelligent doubt. For answer, so far as the author can see, we are limited to two views. We must either assume the inheritance of acquired characters, or that all characters were present in the primordial germ cell.

As regards the inheritance of acquired characters, much work has accumulated both for and against its acceptance. On the zoological side in particular experimentation tends to support the view that acquired characters are non-heritable, while on the botanical side the tendency is perhaps in the other direction. The germ tissues in plants are not as early set apart from the soma as in animals, and are not nourished in an environment so constant and so well protected from environmental effects. Perhaps these facts have some bearing on the question. Nevertheless, any such broad generalization found true for plants would also be true for animals, even if its operation could not be so easily and clearly observed.

The alternative hypothesis proposed by Bateson, that all characters were present in the primal organisms, while not a very satisfying view, finds a parallel in the development of the adult from the egg. The biological world is pretty well agreed that every important character manifest in the adult is represented in some way in the germ cell. If then the mature individual has arisen by differentiation and specialization from a single cell, manifestly it is not unthinkable to suppose that higher animals were likewise represented in the primordial protozoa.

With the evidence before us, conflicting as it is, it is clearly impossible at the present time to say how evolution has occurred, yet, if personal opinions are not out of place on an occasion of this kind, it may be said that the inheritance of environmental effects seems destined to play a more important part in the final solution of organic descent than is accorded it at the present time.

Desmotropy: Alvin S. Wheeler.

The first case of keto-enol isomerism among the phenols of the naphthalene series was recently reported by Willstaetter and Wheeler. Juglone, a dyestuff in green walnut shells, yields on reduction 1, 4, 8-trihydroxynaphthalene, melting at 152°. After once being melted it melts thereafter at 96°. Since this type of compounds is very sensitive to alkalies, weakly basic reagents as semicarbazine and phenylsemicarbazine were employed to detect the carbonyl group. The lower melting product was found to be the ketonic form. Some work, not yet published, on 1, 4, 5, 6-tetrahydroxynaphthalene reveals another case of this nature. Here, however, it has been impossible to separate the two forms, the compound melting at 154° responding readily to both enolic and ketonic reactions. Numerous isomerization methods fail to reveal another form. The application of Knorr's ferric chloride and Kurt Meyer's bromine method to approximate the relative amounts of the isomers present is not practicable to the above cases. Ferric chloride oxidizes the compounds to quinones while bromine enters the ring of either form.

The H-H Waterwheel and Pump for Farm Waterworks: T. F. Hickerson.

The Hutchison-Hickerson waterwheel and pump, recently invented by R. B. Hutchinson of Wilkinsburg, Pa., and T. F. Hickerson, of Chapel Hill, N. C., is a discovery of a new application of the

old principle of the overshot wheel in the design of a small easy running combination wheel and pump and stand (made in the factory complete for installation) to utilize the flow and fall of small brooks as power for operating continuously a pump which pushes pure spring water to higher elevations. The remarkable simplicity, adaptability and reliability of this machine brings it in direct competition with hydraulic rams, all of whose defects seem to be met satisfactorily by the wheel and pump. One dozen of these wheels and pumps have been introduced in North Carolina during the past year. Among these is one which delivers every day through a vertical height of 45 feet 500 gallons of spring water for a large farm home, where the power of the stream which operates the wheel is only $\frac{1}{100}$ of a horse power.

On Leidy's Ouramœba and its Occurrence at Greensboro, N. C.: E. W. GUDGER.

In the fall of 1914 considerable numbers of large and active ouramœbas were found at Greensboro. The amœbas themselves and the locality in which they were found were described. Their activities both in feeding and moving were discussed, and it was noted that there was no reversal of polarity, the tail-feather-like mass of fungous hyphæ always remaining posterior. The history of this interesting organism was then reviewed, and the conclusion arrived at that ouramœba (tailed amœba) is nothing but an ordinary amœba which has ingested fungous spores which have germinated and formed a mass of mould hyphæ which project from the posterior end of the animal. The full paper will be published shortly.

Some Igneous Rocks of Mount Collier: JOHN E. SMITH.

Mount Collier is in Orange County, N. C., about five miles west of Chapel Hill. It is typical of those igneous monadnocks of the eastern Piedmont, most of which rise to a common level about 200 feet above the peneplain. It was formerly much higher and of greater extent: this is shown by the position of parts of the mountain that have been separated from it by erosion, also by the fact that Ball Mountain, in Davidson and Rowan counties, of similar rock and structure, has been cut by a river (Yadkin) which flows through it. That the upland level of the region is a peneplain is also proved by the presence of smooth, rounded quartz pebbles on this plain. The mountain consists chiefly of dark rhyolite which made its way upward along the contact between the ancient crystalline schists north of it and the granite on the south. On each of its slopes flow structure has been observed in the weathered rock and in many places where it is fresh. It is called Mount Collier in honor of Professor Collier Cobb, who, in 1892, was the first to recognize its igneous origin. (Specimens and structure sections were used in presenting the paper.)

Some Observations on the Red Cedar: H. R. TOTTEN.

Juniperus virginiana is probably the only one of the four eastern species of *Juniperus* growing in North Carolina. *Juniperus communis* has been credited to the state, but its presence is doubted. The male and female flowers of *Juniperus virginiana* are borne on separate trees. The time of flowering is dependent upon the climate and weather. The male trees begin blooming first and the return of cold weather may delay the female trees. In both the seasons 1914 and 1915 the male trees began blooming nearly six weeks before the female trees. The young "berry" is formed soon after pollination by the growth and fusion of the sporophylls about the ovule. Fertilization takes place about the middle of June. The seeds are matured in the first season. The species is very variable in color and habit of growth, varying in the neighborhood of Chapel Hill and Durham in color from a glaucous to a deep green, and in form from an open spreading tree to a close spreading tree and to a narrow columnar tree.

Seasonal Distribution of the Army Worm Moth at Raleigh, N. C.: C. S. BRIMLEY.

Gives the result of some observations on the abundance of the army worm moth (*Leucania unipuncta*) at Raleigh in 1914, determined by the number caught on a number of nights in a "sugar"-baited moth trap. The observations began in mid-August, 1914, and have continued to the present time, May 7, 1915. The full data will appear in the current number of the *Journal* of the Elisha Mitchell Scientific Society.

Significance of Gossypol in the Cotton Plant: F. E. CARRUTH.

Gossypol, $C_{13}H_{14}O_4$ (or possibly $C_{32}H_{34}O_{10}$) according to Marchlewski[1] appears to be a dihydric (ortho) phenol. It occurs in peculiar glands, "resin glands," in all parts of the cotton plant. Its physiological significance is not clear. The change in color of the cotton flower on aging is probably due to it. It is a yellow substance, dissolving in H_2SO_4 with a red color and oxidizing easily in alkaline solution with a deep blue color.

[1] *J. Prakt. Chem.*, 1899, 60, p. 80.

It is being studied in an endeavor to show that it is a respiration pigment or an anthocyanic substance, rather than an end-product of plant metabolism. An effort to elucidate its constitution is being made by the North Carolina Experiment Station.

Fly-parasites as a Factor in controlling Army-worm in North Carolina in 1914: F. SHERMAN.

The army-worm (*Heliophila unipuncta*) was destructive in many localities in North Carolina in 1914, attacking millet, grasses and grains. Tachina-flies were abundant and laid eggs on the worms. A lot of 534 army-worms was separated into groups according to number of eggs per worm, and rearings made. Worms without visible eggs matured less than 10 per cent. of moths. Of worms with fly-eggs less than 1 per cent. matured moths. Highest development of flies was from worms with 3 parasitic eggs each (32.81 per cent.), the rate consistently declining both below and above that point. On all worms collected, the average was 2.44 fly-eggs per worm, close to the desired optimum. Outbreaks were of short duration and there was no widespread damage by any later broods. A more detailed article covering this work will be found in *Journal of Economic Entomology* for April, 1915.

On the Myth of the Ship-holder, the Echeneis or Remora: E. W. GUDGER.

A brief account was given of some of the data relating to this myth, which began about the time of Pliny the Elder and persisted until about 1660. The true explanation was given by Ekman in 1904 in his work on "dead water." Material and data are being collected for a series of papers giving accounts of and explaining the myth, describing the use of the remora as a living fish hook, and lastly, giving as fully as possible the natural history of the fish—the matter of chief interest being the origin of the sucking disk.

The Sexuality of the Filament of Spirogyra: BERT CUNNINGHAM.

The general opinion, as shown by Wood (1872), Wolle (1887), DeToni, Klebs (1896), Vines, Bennett and Murry, and Mottier (1904), is that the filaments contain cells of one sex. West (1904), basing his assertion upon Hassall (1845), states that cross conjugation is exceedingly rare in Conjugales. The writer found a *Spirogyra* which follows the general description of Quadrata, with the exception of reproduction. This frequently occurred as cross conjugation, the zygotes being in such a position that it could not possibly be a combination of lateral and scalariform conjugation. This occurrence would tend to prove that the filaments of some *Spirogyra* at least are truly bisexual, and that the transition from the bisexual to the unisexual occurred in the family of *Spirogyra*.

Abnormal Specimens of Taraxacum: S. W. GEISER.

This paper notes the occurrence of a clump of dandelions at a point 70 feet E.N.E. of the N.E. corner of Cox Hall, on the campus of Guilford College. Seven specimens showed well fasciation of the flower-stipes. The multiple-headed character was not so pronounced as noted by Kirsch ('09): only two or three stipes in each of the specimens were united. The flower heads were either slightly confluent or independent. At the point of collection, the soil was unusually infertile, and the occurrence suggests Nieuwland's ('09) conclusion that the abnormality is due to a physiological change due to unfavorable soil conditions, and to age. Bowditch ('09) has also noted fasciation of the dandelion (*T. off.*) in an unfavorable environment. Diligent search failed to find abnormal specimens outside of the local circumscribed area.

For the following papers no abstracts have been received.

"The Present Status of the Martian Controversy," by A. H. Patterson.

"Filose Phenomena in Pieces of Gonads of a *Cubomedusa*," by H. V. Wilson.

"More Fossil Plants from the Moncure Shales (32 specimens)," by Collier Cobb.

"Cow Pea Weevil," by Z. P. Metcalf.

"Gossypol, the Toxic Substance of Cottonseed Meal," by W. A. Withers and F. E. Carruth.

"The Influence of Salt Solution on the Development of the Frog Egg," by W. C. George.

"Experimental Alteration in the Direction of Growth of a Sponge," by H. V. Wilson.

"The Importance of Humidity in Health and the Arts (with demonstration of a new form of Humidifier of North Carolina Make)," by A. H. Patterson.

"Simplifying our Methods of Teaching Cell Division," by Z. P. Metcalf.

"Monadnocks and Metamorphism in the Cretaceous Peneplain," by Collier Cobb.

"The Origin of the do, re, mi Syllables for the Musical Scale," by A. H. Patterson.

"Notes on Geology of Smith's Island," by Collier Cobb.

E. W. GUDGER,
Secretary